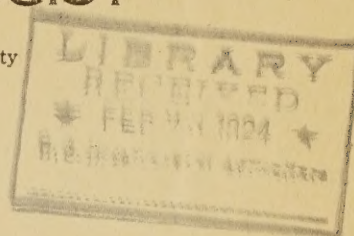


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THE EXTENSION PATHOLOGIST

"To promote economic crop production, improve the quality of the products, and prevent wastage in storage, transit, and at the market."



Issued by

THE OFFICE OF COOPERATIVE EXTENSION WORK

AND

BUREAU OF PLANT INDUSTRY

COOPERATING

UNITED STATES DEPARTMENT OF AGRICULTURE

VOLUME 2.

NUMBER 1.

JANUARY, 1924.

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THE EXTENSION PATHOLOGIST

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Contents of this issue.

	<u>Page</u>
Potato spraying in Pennsylvania	3
Results of six years of potato spraying.....	3
Extension methods used.....	3
The spray ring.....	4
Combination sprayers.....	5
Improved spray practice in general	5
Have you a question?	6
The Cincinnati conference	6
New motion picture, "Hidden Foes in Seed Potatoes"	8
Extension literature	8

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CHAPTER I

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POTATO SPRAYING IN PENNSYLVANIA

By E. L. Nixon, Extension Pathologist,
Pennsylvania State College,

After six years of demonstration, potato spraying in Pennsylvania has reached such proportions that it is burdensome to keep records of it. Indeed, this year it was thought best to confine the demonstrations to two per county except where the work was of recent origin. In view of this, only 220 potato-spraying demonstrations were conducted in 63 of the 67 counties in the State. (Demonstrations are construed in this paper to mean definite measurements of results.) In addition, 1,934 individual farmers were spraying exactly as in the demonstrations mentioned above, and 220 cooperative or spray rings were in operation, reaching 1,971 growers. More than 23,000 acres were sprayed the college way the past year.

Results of six years of potato spraying.

Item	: 1918 :	1919 :	1920 :	1921 :	1922 :	1923
Number of counties....	12	26	46	57	63	63
Number of demonstrations....	32	224	318	402	447	220
Number of acres sprayed.....	314	1,787	6,192	10,140	16,680	23,000
Average yield per acre sprayed.....	142	169	258.3	233.5	220	257
Average increase per acre.....	34.8	42.9	74.7	74.3	66	58
Average per cent increase.....	32.2	34.2	33.3	47.7	44	30
Average cost per acre:	\$8.26:	\$10.85:	\$10.56:	\$11.03:	\$10.34:	\$11.00
Average number of times sprayed.....	5	5.5	6	6.5	6.8	7

Extension methods used.- It was not a difficult task to reach the large potato grower with a spray program, once he was convinced through the demonstrations that spraying is a profitable operation. This was not an easy task in the beginning, since Pennsylvania is a border State, in which late blight is of rare occurrence in most sections except the mountainous area. It just happens that only one year out of the six was a bad late-blight year; i. e., 1920, the worst recorded for Pennsylvania; and 1921 was the driest of the six; yet a glance at the preceding table will show an increase of 33.3 for 1920, and 47.7 for 1921. A large number of demonstrations (experiments) widely distributed and accurately measured, is what sold the value of potato spraying to Pennsylvania farmers, with or without the presence of late blight. Once having demonstrated the value of potato spraying in Pennsylvania, particularly for the larger growers, these men were quick to adopt the practice. Our chief difficulty came in attempting to introduce the method to smaller growers, those men with the small potato patch on the general farm.

The requirements for profitable spraying are the same, whether in the 1-acre patch or in the 40-acre field: namely, a minimum of 200 pounds pressure and 100 gallons per acre per application. To say that, because a man grows only a small patch, the atomizer, knapsack or barrel outfit will suit his needs, while the man with the large field must have a machine that develops 200 pounds pressure, is like saying that an oven that will not get hot is all right for the housewife who bakes for a small family, while for a large family an oven that develops a high temperature is essential. High pressure, plenty of material and proper nozzle adjustment - in short, a complete job - is as necessary for 10 hills of potatoes as for 10 acres.

The spray ring. - What then is the solution for the small grower? A cooperatively owned machine. This machine may be used alternately by two, three, or four owners throughout the season, or the members of the co-operative group or spray ring may employ a student or some one else who has had some instruction on the subject, and put him in charge of the group under the general direction of the extension service.

The necessary equipment and material for the organized group are purchased cooperatively and paid for on a share basis, each acre of potatoes sprayed constituting one share. The total cost in the case of one group or ring was distributed as follows:

Commu- nity.	: Number of : growers:	: Acres : sprayed:	: Yield : sprayed:	: Increase : per acre:	: Total cost : per acre.	: Total net : profits.
Gregg	: 17	: 75	: 187.4	: 56	: \$14.13	: \$2,930.25
Itemized cost of sprayer -----						\$225.00
Salary of student, 3 months at \$75 per month-----						225.00
Stone lime, 3,750 pounds at 1 cent-----						37.50
Copper sulphate, 3,750 pounds at 6-1/4 cents-----						234.38
Interest, \$1,000 at 6 per cent for 6 months-----						30.00
Team, 78 days at \$3 per day-----						234.00
Depreciation, 20 per cent and repairs on machine---						73.87
Total-----						\$1059.75

From the check rows left in each field it was shown that the average increase per acre on the 75 acres was 56 bushels, or a total of 4,200 bushels. Spraying here produced potatoes at a little over 25 cents per bushel. The above is an actual case, and the ring this year completed its fifth successful year.

While the ring type of spraying has not proved as efficient in producing increase yields per acre as the best spraying by individuals, the plan does bring spraying within the means of the growers of a small acreage, making possible a continuous spraying service with the best equipment adequately supervised and uninterrupted by the pressure of haying, harvesting, and other farm work.

Combination sprayers.- This matter of reaching the small potato grower in Pennsylvania with efficient spraying is made less difficult by the existence of a large number of so-called farm orchards. The combination sprayers, equipped with 4-horsepower engines, or better, with pump of 10 gallons per minute capacity, are proving very satisfactory. They are readily converted from potato and truck to orchard sprayers merely by removing the spray boom and attaching a lead of hose and a spray gun. These machines are readily adaptable to other operations around the home, such as disinfecting farm buildings and whitewashing. They are purchased and operated either by individuals, or cooperatively by two, three, or four farmers. Sometimes a spray ring, similar to those described above for potato spraying, is organized. Combination sprayers served 396 farm orchards and as many potato patches the past season.

IMPROVED SPRAY PRACTICE IN GENERAL.

The preceding account should be an inspiration to extension pathologists, particularly to those who have projects under way which involve either the introduction of spray measures or attempts to make those already in use more effective. Whether we are working with apples, melons, potatoes, or other fruits and vegetables, once the value of a spray is known, the principles underlying successful extension of the practice are much the same as those involved in the case of the potatoes in Pennsylvania.

In almost every locality where we have a crop which should be sprayed, there are certain obstacles which prevent attainment of the highest degree in efficiency of disease-control. Many growers are unable to recognize the disease in its early stages. It is frequently the case that they fail to understand the fundamental principles of disease prevention by the application of spray. Some make no attempt to spray; others spray, but use ineffectual apparatus; while still others may use good machinery, but put on the wrong mixture, or perhaps the right one at the wrong time. THE EXTENSION PATHOLOGIST has here a fruitful field for work. What in a certain locality are the reasons underlying failure of farmers effectively to protect crops? How may the extension program best be planned in order to aid in making crop production more profitable?

Many questions in this connection are answered in the above article by Mr. Nixon, and in the accounts of orchard spray service which appeared in the December issue of THE EXTENSION PATHOLOGIST. F. C. M.

HAVE YOU A QUESTION?

The suggestion has been made that we devote a section to questions and answers related to the different things presented by contributors. Believing that this might tend to bring out the type of information concerning extension methods in which our readers are most interested, it is intended to give the plan a trial. If you have a question concerning the work outlined in this number, please send it in to THE EXTENSION PATHOLOGIST. All questions received will be referred to the author of the article which inspired them, and opportunity will be given him in an early issue to discuss the subject on which information has been requested.

THE CINCINNATI CONFERENCE

The extension conference was held from 2 p.m. to 6:30 p.m. on December 31, during the meetings of the American Phytopathological Society, at Cincinnati and was attended by 31 pathologists representing 15 States and the District of Columbia. Dr. M. F. Barrus of New York State acted as chairman.

This informal round-table conference was called for the purpose of discussing extension work in plant pathology, with a view to comparing notes on methods used successfully to carry out different projects. Each extension pathologist present told of his activities for the past year, ample time being allowed for general discussion of subject matter and problems which had arisen in connection with efforts to bring control measures into general application. Space does not permit a full account of the many interesting matters which developed in the course of these discussions.

L. E. Miles, Alabama, citing from his own experience, pointed out the necessity for preliminary plant-disease survey work on the part of the extension pathologist who is beginning work in a State with which he is not acquainted. Problems connected with the development of locally adapted wilt-resistant tomatoes, and the maintenance of a seed source, proved of unusual interest to most of the men present.

Donald R. Porter, Iowa, emphasized the value of check plots not only in connection with his work on corn root-rot control, but in the case of other projects in which demonstrations are involved. Among the numerous agencies used in Iowa for disseminating information on disease control, he mentioned the radio. According to Charles Gregory of Indiana, E. L. Nixon of Pennsylvania, and A. G. Tolaas, representing R. C. Rose of Minnesota, broadcasting of control information has also been practiced in their States. While Mr. Gregory has been unable to trace definite results to this agency, he feels that this apparent failure may have been due in part to the use of poor sending apparatus.

C. T. Gregory, Indiana, pointed out that one desirable requisite of practices recommended in an extension project is that they be easily

accomplished by the farmer, the greatest benefit being brought about by the least change in the usual methods of farming. At this time he called attention to the methods by which he has used newspapers for timely publication of results obtained from demonstrations. He referred also to the use made in his territory of the State farm papers as a means for carrying control information to growers. Monthly weed and plant-disease notes sent to vocational teachers and county agents, and suggestions for advertising ideas sent to county agents, have also proved valuable. Mr. Gregory spoke of the desirability of using illustrated lectures for the purpose of demonstrating to farmers the fundamentals which underlie disease prevention, thus preparing them for undertaking specific control measures.

C. D. Chupp, New York, stated that the needs of the farmers in the way of assistance in disease control are determined as a result of (1) conferences with the county agents; (2) questionnaires which county agents send out, (3) letters and specimens from agents and farmers, (4) plant-disease survey, (5) reports of State research workers, (6) personal visits to the district, (7) and urgent requests from groups of farmers. Once these needs are known, then the programs of work are determined at an annual conference at which there are discussed with the county agents the problems which, as a result of the above-named procedure, the extension pathologist knows to exist, as well as those which the county agent believes are important. After decision concerning programs has been reached at this conference the extension pathologists render assistance by means of (1) oral conferences with county agents or farmers, (2) newspapers articles, (3) distribution of extension and research bulletins, (4) distribution of one-page leaflets, (5) personal or circular letters and mimeographed material, (6) lectures at meetings and schools, (7) field demonstrations, (8) examination of specimens, (9) and making isolations of fungi. Growers have expressed much satisfaction with the system as a result of which the extension service supplies, trains, and supervises field assistants.

E. L. Nixon, Pennsylvania, told of his success in the field of potato and fruit-disease control by spraying. A full account of this work appears in this issue of THE EXTENSION PATHOLOGIST.

E. C. Sherwood, West Virginia, gave an interesting statement concerning the methods used for projecting his work into plans for community scoring which are a part of the extension program in West Virginia. According to this system, a score of 300 points is possible, and all projects in the community, including those relating to plant-disease control, count. Mr. Sherwood has found that farmers take more interest in control measures when they know what they are doing and why. In order to give them a better understanding of the fundamentals of control, he has prepared a set of charts for an introductory lecture on this subject. By this means he has caused a considerable increase in the number of farmers spraying their apples for scab.

F. C. Meier, Washington, D. C., called attention to plans of the Washington office for developing, in cooperation with State and departmental workers, illustrative material for use in presenting pathological subjects to the public. Plans are under way for the development of more charts, lantern slides, and motion pictures for use in extending information on plant-disease control.

The general impression was obtained that those present felt the session to have been of great value. It is hoped that a conference of this type may be held on the occasion of the next annual meeting of the American Phytopathological Society, which will be in Washington in December, 1924.- From report of special committee.

"HIDDEN FOES IN SEED POTATOES"

A one-reel motion picture, entitled "Hidden Foes in Seed Potatoes," was recently completed by the department, and is now ready for use by extension workers. In this film, which was prepared in cooperation with extension pathologists in New York State and New Jersey, an effort has been made to call the attention of farmers to the desirability of planting seed potatoes which are free from such diseases as mosaic, spindling-tuber, and leaf-roll. Attention is called to the fact that freedom of seed stocks from these diseases must be determined by examination of plants in the seed field during the growing season.

Requests for use of this film should be directed to Office of Motion Pictures, United States Department of Agriculture, Washington, D. C.

EXTENSION LITERATURE.

During the December meeting of the American Phytopathological Society in Cincinnati, an informal conference of the majority of extension men present was held for the purpose of discussing policies to be followed in the development of this our news sheet. It was suggested at this time that it would be helpful if current extension literature on pathological subjects by the States could be listed in each issue. Those present volunteered to send in recent publications and to place the writer's name on the mailing list for all such material issued in the future. This will be filed in the office of THE EXTENSION PATHOLOGIST, and citations will be made in THE EXTENSION PATHOLOGIST of papers received. During the past month the following literature has reached this office:

Kansas:

Stokdyk, E. A., Control of sweet potato diseases in Kansas.
Kans. State Agri. Col. Ext. Circ. 30; 8 p. illds.
Nov., 1921.

_____ The value of certified potato seed in Kansas.
Kans. State Agri. Col. Ext. X Form No. 180; 3 p.
illus. Nov., 1921.

Kansas: (Continued)

- Stokdyk, E. A., Seed treatment for oat smut, Kans. State Agri. Col. Ext. X Form No. 185; 3 p., illus. Feb., 1922.
In the field with potato growers. Kans. State Agri. Col. Ext. Circ., 36; 14 p., illus. Sept., 1922.
Potato seed treatment. Kans. State Agri. Col. Ext. X Form No. 186; 4 p., illus. March, 1922.
The cherry fungus leaf spot in Kansas. Kans. State Agri. Col. Ext. Circ. 37; 6 p. illus. Sept., 1922.

Maine:

- Gardner, A. K., Bordeaux mixture - correct preparation and use. Maine Col. of Agri. Ext. Circ. 85, 4 p. illus. Dec., 1923.
Potato seed treatment - The proper method of controlling Rhizoctonia. Maine Col. of Agri. Ext. Circ. 86, 4 p. illus. Dec., 1923.
Control of wild radish and wild mustard. Maine Col. of Agri. Ext. Circ. 87, 4 p., illus. Jan., 1924.

North Carolina:

- Jehle, R. A., et al, Control of late blight of tomatoes in the Blue Ridge Mountains. Bul. of N. C. Dept. Agri., Vol. 40, No. 11; 16 p., illus. Nov., 1919.
Control of cotton wilt. Control of cotton anthracnose. Bul. of N. C. Dept. Agri., Vol. 41, No. 2; 9 p., illus. Jan., 1920.
Mabee, W. B., and Jehle, R. A., Insect pests and diseases of apples and their control in North Carolina. Bul. of N. C. Dept. Agri., 24 p., illus., March, 1921.
Fant, G. W., Bordeaux spray for truck crops. N. C. Agri. Ext. Circ. 138; 8 p. illus. Aug., 1923.

South Carolina:

- Moore, W. D., Common diseases of watermelons, cantaloupes, and cucumbers. S. C. Clemson Agri. Col. Ext. Circ. 57; 10 p., illus. Dec., 1923.

West Virginia:

- Sherwood, E. C., Raising the community score by controlling insects and fungous diseases. W. Va. Col. of Agri. Ext. Circ. 269; 20 p. illus. March, 1923.

Contributions or suggestions with regard to subjects that might profitably be discussed in this news sheet should be addressed to:

Fred C. Meier,
Extension Pathologist,
United States Department of
Agriculture,
Washington, D. C.



Type of potato spraying that proved unprofitable and "convinced" growers that spraying did not pay. Three men required.



A traction potato sprayer showing construction of spray boom and nozzle adjustment.



Spraying the "old snag" with the combination outfit.



The combination outfit which sprayed the "old snag" at work in the potato field. High pressure, not a duster.

